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(19) (CA) **CANADIAN PATENT** (12)

(54) Combuster Wood Burning Stove

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ABSTRACT

In a woodstove for the creation of heat by the combustion of solid fuels, such as wood, it is known to have the exhaust outlet at or near the top of the firebox. In this invention the exhaust outlet is adjustably positioned on the sidewall at the bottom of the firebox. Said outlet allows only the heaviest, densest, and so coolest and most oxidized gases to be elliminated from the woodstoves' firebox. Conversely, the hottest and least oxidized gases are retained within the firebox for re-combustion and subsequent cooling prior to ellimination via said outlet. By virtue of this process controlability is improved. A bypass vent is provided at the top of the firebox, openable for the ellimination of combustion gases, prior to opening the loading door.

SPECIFICATION

This invention relates to a device commonly known as a woodstove, whereby heat is derived by combustion of a solid fuel within a firebox normally incorporated into the woodstove.

It is common for the gases liberated by combustion to be exhausted at or near the top of the firebox, thereby assuming the use of convection to promote the ellimination of said gases. It is known of convection, the least dense gases rise, therefore the usual exhaust location promotes the ellimination of the least dense gases, and thereby retains denser gases within the firebox. It is known of a gas to be denser if cooler, likewise to become less dense if heated. Furthermore, it is known that due to additional molecular weight attendant with oxygen attachment as is characteristic of oxidization, gases of equal temperature will be denser if oxidized. Since the best efficiency of a woodstove is achieved by promoting the most complete oxidization and retaining the heat of combustion within the woodstove, a disadvantage results in locating an exhaust in a position promoting the ellimination of the hottest and least oxidized gases. Conversely, said exhaust position retains cooled, oxidized gases within the firebox creating difficulty in sustaining adequate combustion temperatures required to sustain a small fire, as is normal at times of reduced heating requirements. Furthermore, as the rate of combustion increases, convection forces increase, thereby forcing increased air draft, further promoting increased combustion rates. This so called "positive feedback" process creates difficulty in control and stabilization of combustion rates. Conversely, due to said "positive feedback" process a decline in said combustion rate will decrease convection forces, thereby reducing air draft and further reducing combustion. Said "positive feedback" at lower combustion rates together with, the above mentioned retension of cooler denser gases within the firebox degrades combustion to a level where smoldering occurs. It is known, smoldering is a potentially dangerous and an inefficient combustion mode.

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In a woodstove for the creation of heat by the combustion of solid fuels, such as wood, it is known to have the exhaust outlet at or near the top of the firebox. In this invention the exhaust outlet is adjustably positioned on the sidewall at the bottom of the firebox. Said outlet allows only the heaviest, densest, and so coolest and most oxidized gases to be elliminated from the woodstoves' firebox. Conversely, the hottest and least oxidized gases are retained within the firebox for re-combustion and subsequent cooling prior to ellimination via said outlet. By virtue of this process controlability is improved. A bypass vent is provided at the top of the firebox, openable for the ellimination of combustion gases, prior to opening the loading door.

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This invention relates to a device commonly known as a woodstove, whereby heat is derived by combustion of a solid fuel within a firebox normally incorporated into the woodstove.

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I have found that these disadvantages may be overcome by locating the exhaust outlet at the bottom on the sidewall of the firebox, in a manner by which the size of the exhaust outlet is adjusted by varying said outlets upper extent. Said outlet location allows only the densest, and hence coolest and most oxidized gases, to be elliminated from the firebox, thus retaining the hottest and least oxidized gases within the firebox for re-combustion and subsequent cooling prior to said gases ellimination. The promotion of elliminating said densest exhaust gases is by an action similar to siphonage, (as opposed to convection in normal use) wherein flue gases rise, and so by evacuation draw the bottom layer of gases from the firebox. Furthermore, as the rate of combustion increases, more oxidized gases accumulate within the firebox, impeding the combustion rate by a "negative feedback" process equivalent to partial smothering. Simultaneously, increasing liberation of combustion gases, impedes the air draft input, thereby also reducing combustion. Conversely, due to said "negative feedback" process a decline in said combustion will reduce the amount of oxidized gases within the firebox, and simultaneously increase the amount of air draft to promote said combustion rate. Said "negative feedback" at lower combustion rates together with, the above mentioned retention of hotter less dense gases within the firebox, produces sufficient temperature to retain a small fire, thereby retaining a low heat output without resorting to potentially dangerous and inefficient smoldering.

In drawings which illustrate an embodiment of this invention but do not imply limitation of the invention to this particular embodiment
Figure 1 is an elevation in section of one embodiment.
Figure 2 is a section of the line II-II of Figure 1.

The appliance illustrated comprises a sliding valve door 1, adjusted by a manually operated handle 2, whereby the size and position of vent B, is adjusted. Said adjustment of vent B, controls the retention of cooler, oxidized, denser gases thereby determining combustion rate. Said adjustment is determined by the combustion rate of the fuel being used eg. dried wood requires a lower level of vent B, as opposed to "green unseasoned" wood which requires a comparatively higher level setting of vent B.

A bypass valve 3, manually operated via handle 4, when in bypass position allows gases to be released in a conventional fashion by convection, from the firebox thru vent C, directly into exhaust pipe 6, prior to opening a loading door 5. Allowing the release thru vent C, prevents unsafe release of said gases thru the open loading door 5. A mechanical interlocking rod (not shown) may be provided so the loading door 5, cannot be opened until bypass valve door 3, is placed in the bypass position, indicated by the fantom lines in Figure 1.

As combustion requires air, an air valve 7, provides for regulation of air input thru vent A. The means of adjusting air valve 7, is not shown but maybe manual or automatic. Due to above mentioned "negative feedback" the rate of combustion is normally proportioned to the amount of air draft determined by the air valve 7.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An appliance for the combustion of solid fuels, which in normal use exhausts gases from the combustion chamber thru a vent adjustably positioned at or near the bottom of the sidewall of the combustion chamber.

2. An appliance as defined in claim 1, having a manually operable exhaust vent at or near the top of the combustion chamber for venting combustion gases more completely from the combustion chamber prior to opening loading door.

Fig 1.

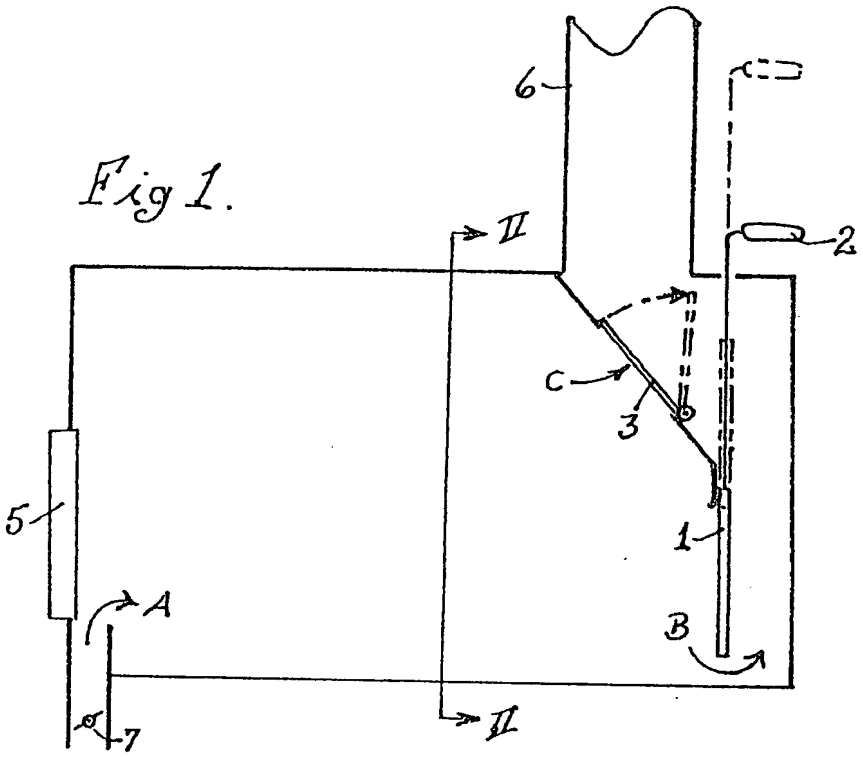
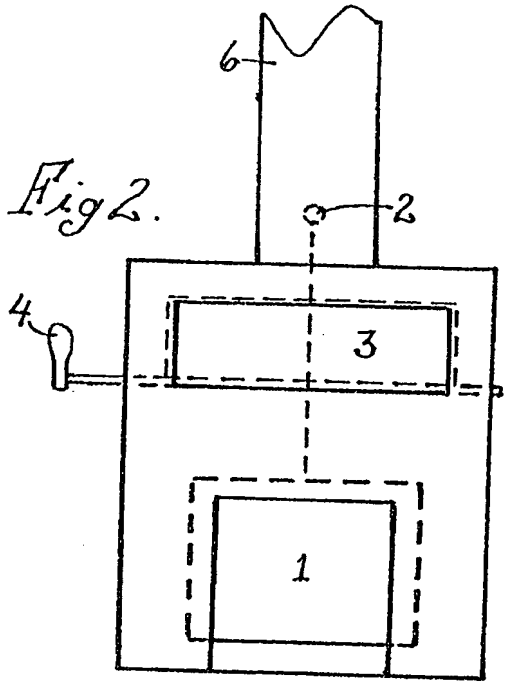


Fig 2.



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